

CLAIMS

1. An apparatus comprising:
a plasma produced light source;
one or more collector optics;
a contaminant trap between the light source and the
one or more collector optics; and
a plasma generating device operative to prevent matter
from reaching the one or more collector optics.
2. The apparatus of claim 1, wherein the light
source comprises an extreme-ultraviolet (EUV) light source.
3. The apparatus of claim 1, wherein the plasma
generating device comprises an antenna.
4. The apparatus of claim 3, wherein the antenna
comprises an RF coil to produce an inductively coupled
plasma.
5. The apparatus of claim 1, further comprising
means for minimizing sputtering of the coil.

6. The apparatus of claim 5, wherein the means for minimizing sputtering of the coil comprises a Faraday shield.

7. The apparatus of claim 1, further comprising:
an electromagnetic field generating device to attract the ionized debris particles toward the contaminant trap.

8. The apparatus of claim 7, wherein the contaminant trap comprises a plurality of foil elements.

9. The apparatus of claim 8, further comprising a power source operative to produce a potential difference between neighboring metal foil elements in the contaminant trap to attract the ionized particles to the metal foils.

10. The apparatus of claim 1, the further comprising a power supply connected to the coil.

11. The apparatus of claim 10, wherein the power supply is operative to supply radio frequency (RF) power.

12. The apparatus of claim 10, wherein the power source is operative to supply direct current (DC) power.

13. The apparatus of claim 1, wherein the light source comprises electrodes.

14. The apparatus of claim 13, wherein the electrodes comprise a first material and are coated by a second material.

15. The apparatus of claim 14, wherein the second material is more easily ionized than the first material.

16. The apparatus of claim 14, wherein the second material is more easily ablated than the first material.

17. The apparatus of claim 14, wherein the first material comprises a tungsten alloy and the second material comprises an alkali metal.

18. The apparatus of claim 17, wherein the alkali metal is cesium.

19. The apparatus of claim 17, wherein the alkali metal is lithium.

20. The apparatus of claim 1, further comprising a second coil between the contaminant trap and the collector optics.

21. The apparatus of claim 20, wherein the second coil is operative to ionize debris particles that pass the contaminant trap.

22. A method comprising:
ionizing debris particles generated by a plasma producing light source in a lithography system; and
diverting the ionized debris particles away from collector optics in the lithography system.

23. The method of claim 21, wherein said attracting comprises:

effecting the path of the ionized debris particles toward a contaminant trap between the light source and collector optics in the lithography system.

24. The method of claim 21, wherein said attracting comprises:

producing a potential difference between elements in the contaminant trap.

25. The method of claim 21, wherein said ionizing comprises:

generating a secondary plasma between the light source and the collector optics.

26. The method of claim 25, wherein said generating secondary plasma comprising generating a plasma by inductive coupling to minimize self-biasing.

27. The method of claim 26, wherein Faraday shields are used to minimize self-biasing.

28. The method of claim 25, wherein said generating the secondary plasma comprises:

providing radio frequency (RF) power to a coil between the light source and the contaminant trap.

29. The method of claim 21, further comprising:
generating extreme ultraviolet (EUV) radiation with the light source.

30. A system comprising:
a light source chamber including

a plasma produced light source,
one or more collector optics,
a contaminant trap between the light source and
the one or more collector optics, and
a plasma generating device operative to effect
removal of matter from reaching the one or more
collector optics; and
a lithography chamber connected to the light source
chamber.

31. The system of claim 30, wherein the light source
comprises an extreme-ultraviolet (EUV) light source.

32. The system of claim 31, wherein the plasma
generating device comprises an antenna.

33. An apparatus comprising:

a light chamber including

a plasma produced light source in a light
chamber;

one or more collector optics,

a contaminant trap between the light source and
the one or more collector optics, and

a plasma generating device operative to ionize debris in the light chamber.

34. The apparatus of claim 33, wherein the light source comprises an extreme-ultraviolet (EUV) light source.

35. The apparatus of claim 33, wherein the plasma generating device comprises an antenna.

36. The apparatus of claim 35, wherein the antenna comprises an RF coil to produce an inductively coupled plasma.